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PATENT

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UNITED STATES PATENT APPLICATION

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of

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for

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AMUSEMENT RIDE WITH

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CABLE-LAUNCHED CARRIER

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1 BACKGROUND OF THE INVENTION

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3 FIELD OF THE INVENTION

4 This invention relates to an amusement ride that uses cables to elevate a carrier for one or
5 more participants between a multitude of towers.

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7 DESCRIPTION OF THE RELATED ART

8 United States patent no. 5,632,686 employs a multitude of towers and cables to elevate a
9 carrier for participants. There is no indication, however, that at least the top portion of the
10 towers would be flexible. In fact, the arches shown in Figure 4 between adjacent towers suggests
11 that there is no such flexibility.

12 Several patents, *e.g.*, United States patent numbers 5,421,783; 5,649,866; and 5,810,671
13 have a passenger carrier that is accelerated upward by bungee cords and can relatively freely
14 swing about the ends of such cords. Patent number 5,649,866 uses three towers; patent numbers
15 5,421,783 and 5,810,671 utilize three towers. No mention is made of any flexibility in the
16 towers of these patents. The lattice construction shown in the drawings of patent numbers
17 5,649,866 and 5,810,671 imply that there would be no such flexibility. Indeed, lines 56 through
18 56 in column 2 of patent number 5,649,866 refer to the towers as "three upstanding, stationary
19 towers"; and lines 32 through 33 in column 2 of patent number 5,8180,671 use the descriptive
20 terminology "pair of spaced, stationary towers." The relatively short height of the towers shown
21 in the drawings for patent number 5,421,783 provides a similar implication. And, in fact, line 11
22 in column 6 of that patent describes the towers as being "rigid structures."

23 The passenger carrier in patent numbers 5,421,783; 5,649,866; and 5,810,671 that is
24 accelerated upward by bungee cords can relatively freely swing about the ends of such cords.
25 There is, however, no controlled rotation of the carrier; patent number 5,810,671, in lines 2
26 through 5 of column 7, merely indicates that, by "shifting their weight" participants can cause
27 the carrier of the invention to commence rolling.

28 United States patent no. 6,083,111 does involve controlled rotation of a passenger
29 chair (also termed a "support") for an amusement ride. The degree of rotation is, however,
30 purposefully limited; the limited rotation that is possible apparently occurs only over a restricted,

1 fixed portion of a course upon a tower; and only downward movement occurs when the chair has
2 been rotated from its initial substantially vertical position.

3 Lines 31 through 37 in column 2 of patent no. 6,083,111 explain, "The passenger
4 support, together with the passenger, is tilted forward into a falling orientation which is at a
5 predetermined tilt-angle to the pre-fall orientation. The passenger support, together with the
6 passenger, is dropped or propelled from the drop position to a lower position while the passenger
7 support and the passenger are in the forward tilted falling orientation"

8 Lines 3 and 4 in column 3 further clarify, "for safety reasons, the tilt-angle of the
9 passenger and the passenger support is limited"

10 Patent no. 6,083,111 continues, in lines 26 through 28 of column 3, by asserting, "A
11 travel course for the carriage is established by engaging a guide that is connected to the carriage
12 upon an elongate rail or track that is coupled to an elevating tower."

13 Lines 23 through 25, 39 through 42, and 46 through 49 of column 3 state, "The degree of
14 tilt between the pre-fall orientation 92 and the falling orientation 95 is predetermined and
15 restricted When the latching mechanism 40 is released, the passenger support 22 is
16 permitted to tilt or be tilted from the pre-fall orientation 92 toward and into the falling orientation
17 95. . . . Alternatively, the tilting action can be induced by an operating mechanism B43B which
18 in the described embodiment is a rotary motor and may be exemplarily electromechanical,
19 hydraulic or other suitable configuration."

20 Lines 39 through 46 and 55 through 57 of column 6 consistently provide, "Upon reaching
21 the drop position 70, the passenger support 22 is permitted to tilt, or is tilted from the upright and
22 sitting pre-fall orientation 92 to the tilted falling orientation 95. To accomplish such tilting, the
23 latching mechanism 40 is released and the passenger 55 is either motored to the tilted position
24 using the operating mechanism 43 or the support 22 is simply allowed to drop to the tilted
25 position and falling orientation 95 under the passenger's 55 own weight. . . . The tilting action
26 is accommodated by the pivot connection 37 and is limited either by the operating mechanism 43
27 or appropriate stops." Then line 67 of column 3 through line 2 of column 7 declares, "Either
28 simultaneously or shortly thereafter, the carriage 34 begins to drop over a falling travel distance
29 73."

1 Finally, with respect to patent number 6,083,111, lines 53 through 56 in column 7
2 observe, "The maximum safe tilt angle 98 is experimentally determined and then the actual tilt
3 angle 98 is restricted within a range between that determined angle and the upright position."

4 Furthermore, none of the preceding patents has a restraint system for the participant
5 which employs a harness releasably held in place through the insertion of a serrated rod into an
6 aperture of a directionally biased block.

7 Patent number 5,632,686 does not discuss a restraint system. Lines 20 and 21 of column
8 7 in patent number 5,421,783 simply note, "... each rider is strapped in with dual shoulder belts
9 and a standard lap belt." Patent number 5,649,866, in lines 58 through 61 of column 3, and
10 patent number 5,810,671, in lines 24 through 27, utilize identical language: "Associated with
11 each seat 58 is a five-point harness assembly 60 for securing an individual within the seat 58
12 when an individual is seated therein." And patent no. 6,083,111, in lines 6 through 17 of column
13 5, provides, "The carriage 34 has a passenger support or car 22 mounted thereupon. The
14 passenger support 22 includes a chair-type structure upon which the passenger 55 directly rests.
15 The chair includes a headrest, restraint 31 for retaining the passenger 55 safely in the support 22
16 throughout the ride's 10 cycle. The restraint 31 is pivotally connected at an upper portion 28 of
17 the passenger support 22. Supplemental restraints may also be included as required or desired.
18 The several restraints however, are of conventional design and well-known in the amusement
19 ride arts."

20 And none of the preceding patents includes a device for maintaining tension in a cable
21 which assists in providing the propulsive force to the carrier for the participant or participants on
22 an amusement ride.

23 Examples of patents which apply to fluid-powered cylinders associated with cables for
24 powering amusement rides are United States patent numbers 5,632,686; 5,704,841; 5,893,802;
25 6,001,022; and 6,176,788.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts the Amusement Ride with Cable-launched Carrier with a means for propelling a carrier attached to a first end of cables from towers.

Figure 2 illustrates the Amusement Ride with Cable-launched Carrier with a means for propelling a carrier connected at an intermediate point on each cable.

Figure 3 shows the connection of a fluid-powered cylinder having a continuous cable to the first end of a cable.

Figure 4 portrays the attachment of a fluid-powered cylinder having a continuous cable at an intermediate point on a cable.

Figure 5 demonstrates the connection a fluid-powered cylinder having a non-continuous cable to the first end of a cable.

Figure 6 is a view showing the attachment of a fluid-powered cylinder having a continuous cable at an intermediate point on a cable.

Figure 7 shows a first view of the Controllably Rotatable Seat.

Figure 8 provides an alternate view of the Controllably Rotatable Seat.

Figure 9 depicts a target on a tower to be detected by a sensor associated with the Controllably Rotatable Seat.

Figure 10 provides a normal view of the Locking Apparatus.

Figure 11 is an exploded view of the Locking Apparatus.

Figure 12 shows a rod having its second end in the shape of a loop.

Figure 13 illustrates a rod having screw threads on its second end.

Figure 14 depicts a spring used at the end of a cable to reduce slackness.

Figure 15 shows a weight attached to the end of a cable to reduce slackness.

Figure 16 illustrates a cylinder connected to the end of a cable to reduce slackness.

Figure 17 portrays a spring used at an intermediate point of a cable to reduce slackness.

Figure 18 demonstrates a weight used at an intermediate point of a cable to reduce slackness.

Figure 19 shows a cylinder pushing against a cable at an intermediate point to reduce slackness.

1 Figure 20 illustrates a cylinder pulling against a cable at an intermediate point to reduce
2 slackness.

3 Figure 21 shows The Amusement Ride with Cable-launched Carrier having a
4 fluid-powered cylinder with a non-continuous cable connected, oriented with the valve for
5 supplying fluid downward, connected at an intermediate point of the cable which has a
6 pressurizable cylinder connected to the first end of said cable.

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DESCRIPTION OF THE PREFERRED EMBODIMENT

As its name implies, the Amusement Ride with Cable-launched Carrier has, as illustrated in Figure 1 and Figure 2, a cable 302 suspended from a tower 401. Preferably, there are a multitude of cables 302 and towers 401, more preferably and odd number, and most preferably three.

At least the upper portion 402 of at least one tower 401 and, preferably of all the towers 401, is flexible.

A means 421 for propelling a carrier 303 for one or more participants is attached either to a first end 304 of each cable 302 or at an intermediate point between the first end 304 and the second end 305 of a cable 302. The second end 305 of each cable 302 is connected to the carrier 303.

This means can be any mechanism that is well known in the art for propelling a carrier 303 of an amusement ride. For example, it can be a high-speed winch, a fluid-powered cylinder having a continuous cable, or a fluid-powered cylinder having a non-continuous cable.

Figure 3 shows a fluid-powered cylinder 403 having a continuous cable 404 attached to the first end 304 of the cable 302 which propels the carrier 303. The first end 304 is merely connected to the continuous cable 404.

The continuous cable 404 can, alternatively, be connected at an intermediate point of the cable 302, as portrayed in Figure 4. In this embodiment, a first end 405 of a transfer cable 406 is connected to the continuous cable 404; and a second end 407 of the transfer cable 406 is connected to a slide 408 through which the cable 302 can substantially freely move. The first end 304 of the cable 302 is attached to any structure 423 which will hold such first end 304 substantially stationary; and the slide 408 is preferably, but not necessarily, a pulley.

A fluid-powered cylinder 403 having a non-continuous cable is attached to the first end of the cable 302 by merely having the first end 304 of the cable 302 connected to a piston 409 slidably mounted within the cylinder 403, as depicted in Figure 5.

When a fluid-powered cylinder 403 having a non-continuous cable is connected at an intermediate point of the cable 302, this is done exactly as in the case of the continuous cable except that the first end 405 of the transfer cable 406 is attached to the piston 409, as portrayed in Figure 6. And, with respect to the embodiments of the fluid-powered cylinder 403 discussed so

1 Preferably, but not necessarily, there would also be a means for retaining the participant
2 to the seat 1, such as a harness.

3 The arm 2 and the means for rotating 3, as well as the lever arm 4 when employed, are
4 attached to the carrier 303. Attachment of the arm 2, and the lever arm 4 when employed, is a
5 rotatable attachment to the carrier 303.

6 A timer 9 communicating with the means for rotating 3 can be programmed with the time
7 to commence rotation and the time to begin rotating the seat 1 to its original orientation.

8 Alternatively, a target 10 can be located on a tower 401 at a point where rotation is
9 desired to commence as the seat 1 passes the target 10, and a second target 11 can be placed on a
10 tower 401 at a point where it is desired to have the seat 1 start rotating back to its original
11 orientation. A sensor 12 capable of detecting the targets 10, 11 would be mounted on the carrier
12 303 and communicate either directly or through a preferably, but not necessarily, programmable,
13 logic unit 13 such as a computer with the means for rotating 3. Optionally, only a single target
14 10 would be employed; and the seat 1 would start rotating as it passed the target 10 going in a
15 first direction and would begin rotating to its original orientation as it passed the target 10 going
16 in the substantially opposite direction.

17 A device known in the art for measuring distances could also determine the distance
18 between a known elevation (or other position) and the carrier 303. Such device communicates
19 through a, preferably, but not necessarily, programmable, logic unit 13 such as a computer with
20 the means for rotating 3. Initial rotation would commence at a given distance, and rotation back
21 to the original orientation of the seat 1 would begin at another specified distance, with such
22 criteria either set into the logic unit 13 at the factory or, when the logic unit is programmable,
23 programmed into the logic unit 13 by a user. Communication in this embodiment would
24 preferably, but not necessarily, be by digitally encoded radio signals.

25 Finally, any device well known in the art for measuring the distance a cable 302 moves
26 could function just as does the device for measuring distances discussed in the preceding
27 paragraph.

28 Also, as discussed above, any device known in the art for measuring speed or
29 acceleration or any other measurable criterion associated with the amusement ride could

1 the end 312 through which the rod 311 extends because it is desired to have the gas exert a force
2 which tends to push the rod 311 from the cylinder 330 rather than tending to pull the rod 311 into
3 the cylinder 330.

4 Still another example of a means for applying the substantially transverse force is
5 portrayed in Figure 20. A pressurizable cylinder 331 is connected to the rigid structure 324, has
6 a force transferring device 332, either a rod or cable, with the first end 313 of the force
7 transferring device 332 attached to the piston 314, and has the second end 315 of the force
8 transferring device 332 connected to the slide 323. In all other respects the pressurizable
9 cylinder is the same as pressurizable cylinder 310.

10 The most preferred embodiment of the Amusement Ride with Cable-launched Carrier
11 comprises three towers 401, each tower suspending a cable 302, with at least one of said towers
12 401 having a flexible upper portion 402; associated with each cable 302, a fluid-powered
13 cylinder 403 having a non-continuous cable, oriented with the valve 413 downward, and
14 connected to the cable 302 at an intermediate point of the cable 302; a transfer cable 406 which
15 is flexible and bends around any device 420 for changing the direction of a physical force
16 without creating substantial friction, such as a pulley, so that the transfer cable 406 travels
17 upward before connecting to the slide 408 around the cable 302 in order, as described above, to
18 connect a fluid-powered cylinder 403 to each cable 302; a pressurizable cylinder 310 connected
19 to the first end 304 of each cable 302 and to the object 309 as the means for applying a pulling
20 force along the cable 302 in the direction away from the carrier 303 to which the cable 302 is
21 attached, with the object 309 located horizontally near the device 420; for each cable 320,
22 another device 420 around which the cable 302 passes between the slide 408 and the first end
23 304 of the cable 302; and a carrier 303 connected to the second end of each cable 302.